

high temperature or steam is decontaminated by gaseous or vapor methods in an airlock or chamber designed for this purpose.

(d) Personnel may enter and leave the facility only through the clothing change and shower rooms. Personnel must shower each time they leave the facility. Personnel may use the airlocks to enter or leave the laboratory only in an emergency.

(e) Street clothing must be removed in the outer clothing change room and kept there. Complete laboratory clothing, including undergarments, pants and shirts or jumpsuits, shoes, and gloves, will be provided and must be used by all personnel entering the facility. Head covers are provided for personnel who do not wash their hair during the shower. When leaving the laboratory and before proceeding into the shower area, personnel must remove their laboratory clothing and store it in a locker or hamper in the inner change room.

(f) When etiologic agents or infected animals are present in the laboratory or animal rooms, a hazard warning sign incorporating the universal biohazard symbol must be posted on all access doors. The sign must identify the agent, list the name of the commander or institute director or other responsible person(s), and indicate any special requirements for entering the area (for example, the need for immunizations or respirators).

(g) Supplies and materials needed in the facility are brought in by way of the double-doored autoclave, fumigation chamber, or airlock which is appropriately decontaminated after each use. After securing the outer doors, personnel within the facility retrieve materials by opening the interior doors of the autoclave, fumigation chamber, or airlock. These doors are secured after materials are brought into the facility.

(h) Materials (for example, animals and clothing) not related to the experiment being conducted are not permitted in the facility.

(i) Whenever possible, avoid using any glass items.

#### § 627.17 Toxins.

The laboratory facilities, equipment, and procedures appropriate for work with toxins of biological origin must reflect the intrinsic level of hazard posed by a particular toxin as well as the potential risks inherent in the operations performed. All toxins must be considered to pose a hazard in an aerosol form. However, most toxins exert their effects only after parenteral exposure or ingestion, and a few toxins present a dermal hazard. In general, toxins of biological origin are not intrinsically volatile. Thus, the laboratory safety precautions appropriate for handling these materials closely parallel those for handling infectious organisms. The requirements in this section for the laboratory use of toxins of biological origin include the requirements in § 627.12(a) and the following:

(a) *Vacuum lines.* When vacuum lines are used with systems containing toxins, they will be protected with a HEPA filter to prevent entry of toxins into the lines (or sink drains when water aspirators are used).

(b) *Preparation of concentrated stock solutions and handling closed primary containers of dry toxins.* Preparation of primary containers of toxin stock solutions and manipulations of closed primary containers of dry forms of toxins will be conducted—

(1) In a chemical fume hood, a glove box, or a biological safety cabinet or equivalent containment system approved by the safety officer.

(2) While wearing eye protection if using an open-fronted containment system.

(3) Ensuring that gloves worn when handling toxins will be disposed of as toxin waste, with decontamination if required.

(4) With the room door closed and posted with a universal biohazard sign, or other sign, indicating that toxin work is in progress. Extraneous personnel shall not be permitted in the room during operations.

(5) Ensuring that toxins removed from hoods or biological safety cabinets are double-contained during transport.

(6) After verification of hood or biological safety cabinet inward airflow is

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made by the user before initiating work.

(7) Within the operationally effective zone of the hood or biological safety cabinet.

(8) Ensuring that nondisposable laboratory clothing is decontaminated before release for laundering.

(9) Ensuring that all individuals who handle toxins wash their hands upon each exit from the laboratory.

(10) With two knowledgeable individuals present whenever more than an estimated human lethal dose is handled in a syringe with a needle. Each must be familiar with the applicable procedures, maintain visual contact with the other, and be ready to assist in the event of an accident.

(c) Manipulations with open containers of dry forms of toxins. Handling dry forms of toxins in uncovered containers (for example, during weighing) will be performed following the requirements stated in §§ 627.12(a), 627.17 (a) and (b), and the following:

(1) Manipulations will be conducted in a HEPA filtered chemical fume hood, glove box, or biological safety cabinet. In addition the exhaust may be charcoal filtered if the material is volatile.

(2) When using an open-fronted fume hood or biological safety cabinet, protective clothing, including gloves and a disposable long-sleeved body covering (gown, laboratory coat, smock, coverall, or similar garment) will be worn so that hands and arms are completely covered. Eye and approved respiratory protection is also required. The protective clothing will not be worn outside of the laboratory and will be disposed of as solid toxin waste.

(3) Before containers are removed from the hood, cabinet, or glove box, the exterior of the closed primary container will be decontaminated and placed in a clean secondary container.

(4) When toxins are in use, the room will be posted to indicate "Toxins in Use—Authorized Personnel Only." Any special entry requirements will be posted on the entrance(s) to the room.

(5) All operations will be conducted with two knowledgeable individuals present. Each must be familiar with the applicable procedures, maintain visual contact with the other, and be

ready to assist in the event of an accident.

(6) Individuals handling toxins will wash their hands upon leaving the laboratory.

(d) Additional considerations of specific toxin properties. The following requirements are in addition to the requirements stated in the paragraphs above. Determine whether the material fits § 627.17 (b) or (c), and complies with the appropriate section and the following when applicable:

(1) When handling dry forms of toxins that are electrostatic—

(i) Do not wear gloves (such as latex) that help to generate static electricity.

(ii) Use glove bag within a hood or biological safety cabinet, a glove box, or a class III biological safety cabinet.

(2) When handling toxins that are percutaneous hazards (irritants, necrotic to tissue, or extremely toxic from dermal exposure)—

(i) Gloves will be selected that are known to be impervious to the toxin and the diluent (when applicable) for the duration of the manipulations.

(ii) Disposable laboratory clothing will be worn, left in the laboratory upon exit, and disposed of as solid toxin waste.

(e) Aerosol exposures. The requirements found in § 627.17 (a) and (b) will be complied with plus the following:

(1) Chambers, nose-only exposure apparatus, and generation system must be placed inside a fume hood, glove box, or a Class III biological safety cabinet. Glove boxes and Class III biological safety cabinets will have HEPA filters on both inlet and outlet air ports.

(2) The atmosphere from within the exposure chamber will be HEPA filtered before release inside the hood, glove box, or cabinet.

(3) All items inside the hood, glove box, or Class III biological safety cabinet will be decontaminated upon removal. Materials such as experimental samples that cannot be decontaminated directly will be placed in a closed secondary container, the exterior of which will be decontaminated and labeled appropriately. Animals will have any areas exposed to toxin wiped clean after removal from the exposure apparatus.

(4) The interior of the hood, glove box, or cabinet containing the chamber and all items will be decontaminated periodically, for example, at the end of a series of related experiments. Until decontaminated, the hood, box, or cabinet will be posted to indicate that toxins are in use, and access to the equipment and apparatus restricted to necessary, authorized personnel.

**§ 627.18 Emergencies.**

(a) *Introduction.* All laboratories will establish specific emergency plans for their facilities. Plans will include liaison through proper channels with local emergency groups and with community officials. These plans will include both the building and the individual laboratories. For the building, the plan must describe evacuation routes, facilities for medical treatment, and procedures for reporting accidents and emergencies. The plans will be reinforced by drills. Emergency groups and community officials must be informed of emergency plans in advance of any call for assistance. See AR 385-69.

(b) *General emergency procedures.* The following emergency procedures will be followed for laboratory accidents or incidents—

(1) Using appropriate personal protection, assist persons involved, remove contaminated clothing if necessary, decontaminate affected areas, and remove personnel from exposure to further injury if necessary; do not move an injured person not in danger of further harm. Render immediate first aid if necessary.

(2) Warn personnel in adjacent areas of any potential hazards to their safety.

(3) In case of fire or explosion, call the fire department or community fire brigade immediately. Follow local rules for dealing with incipient fire. Portable fire extinguishers will be made available with instructions for their use. Fire fighters responding to the fire scene will be advised to wear a self-contained positive pressure breathing apparatus to protect themselves from toxic combustion by-products.

(4) Laboratories must be prepared for problems resulting from severe weather or loss of a utility service. In the event of the latter, most ventilation systems

not supplied with emergency power will become inoperative. All potentially hazardous laboratory work must stop until service has been restored and appropriate action has been taken to prevent personnel exposure to etiologic agents.

(5) In a medical emergency, summon medical help immediately. Laboratories without a medical staff must have personnel trained in first aid available during working hours.

(6) For small-scale laboratory accidents, secure the laboratory, leave the area, and call for assistance.

(7) When handling mixed hazards (for example, a substance or mixture that may be infectious and radioactive, or infectious and chemically toxic), respond with procedures addressing the greater hazard first, and then follow through with those for the lesser hazards to ensure that all appropriate steps have been taken.

(c) *Evacuation procedures.* Building and laboratory evacuation procedures will be established and communicated to all personnel.

(1) Emergency alarm system. (i) There will be a system to alert personnel of an emergency that requires evacuation of the laboratory or building. Laboratory personnel must be familiar with the location and operation of alarm equipment.

(ii) Isolated areas (for example, cold, warm, or sterile rooms) will be equipped with an alarm or communication system that can be used to alert others outside to the presence of a worker inside, or to warn workers inside of an emergency that requires evacuation.

(2) Evacuation routes will be established and an outside assembly area for evacuated personnel must be designated. All individuals should be accounted for.

(3) Shut-down and start-up procedures.

(i) Guidelines for shutting down operations during an emergency evacuation will be available in writing. Those guidelines will include procedures for handling any power failure emergency.

(ii) Written procedures will also be provided to ensure that personnel do not return to the laboratory until the emergency is ended. Those procedures